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Operational Fires: Challenges for Implementing OMFTS

by

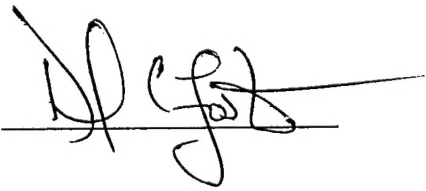
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The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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## ABSTRACT

Operational Maneuver from the Sea (OMFTS) breaks tradition with current amphibious doctrine and focuses upon dominant maneuver to influence operational objectives. Reliant upon surprise, speed, and tempo to overwhelm the enemy's decision cycle, OMFTS shifts emphasis from an initial force requiring a substantial build-up of supplies and combat power ashore to a light, flexible, aggressive force dependent upon sea-based logistics and fires. Without a credible operational fires capability, OMFTS will fail.

OMFTS expands the Joint Force Commander's battlespace considerably and increases the importance of situational awareness and the responsiveness and lethality of joint fires. The challenges the Joint Force Commander faces in providing operational fires center upon the three subsystems of the joint fire support system – target acquisition, attack resources, and command and control. Each of these subsystems must be interoperable between the services and have a credible capability to meet the Joint Force Commander's requirements. Unless we make some prudent decisions today, the Joint Force Commander will be unable to properly support OMFTS with operational fires.

*Joint Vision 2010*, the Joint Chiefs' of Staff conception of future warfighting, promotes four operational concepts which have a profound influence on combat operations: dominant maneuver, precision engagement, full dimensional protection, and focused logistics. These four concepts encompass many of the challenges facing the Joint Force Commander (JFC) in future operations. Each is comprised of functions that contribute to the success of a major operation or campaign. All are equally important, and all must be considered. For the purpose of this paper, the focus will be upon dominant maneuver and precision engagement as we consider operational fires supporting Operational Maneuver from the Sea (OMFTS). In this regard, the JFC will have a credible operational fires capability to support OMFTS in 2015 provided there are prudent decisions made today to coordinate technological changes and service programs, modify joint doctrine, and acquire appropriate weapon systems.

## INTRODUCTION

The end of the Cold War ushered in a new era for the United States Armed Forces. The demise of the Soviet Union as America's peer competitor left the United States as the world's lone superpower. The Department of Defense resonated with the shock waves caused by the fall of the Iron Curtain and dramatic cuts in equipment and manpower occurred to pay for the proverbial "peace dividend." As U.S. national security interests shifted, the armed forces redefined and refined their roles and missions to meet the challenges of the post-Cold War period. In response, the Naval Services shaped and conveyed their vision of future warfighting in two white papers -- . . . *From the Sea* and *Forward . . . From the Sea*. These documents were instrumental in refocusing the strategic direction of the Naval Services and for altering the U.S. Navy's conception of littoral warfare. Subsequently, the Marine Corps

developed and published its seminal work, *Operational Maneuver from the Sea* as a necessary evolution in amphibious doctrine.

OMFTS presupposes the high risk of conflict in the oceans' littorals due to a majority of the world's population residing within 200 miles of the coast. In these densely populated regions, the Marine Corps envisions increased strife and chaos as these locales continue to dominate the international environment. Within these littorals, the Navy and Marine Corps "must be prepared to engage in a broad array of military activities . . . from operations other than war, which may nevertheless involve combat, to major regional conflicts."<sup>1</sup>

OMFTS elevates traditional amphibious operations to the operational level of war by directing forces against an enemy center of gravity or critical vulnerability.<sup>2</sup> OMFTS accomplishes this by utilizing the sea as maneuver space vice simply a medium for movement from the port to the objective area. Current amphibious doctrine prescribes landing a force, pausing while combat power and logistics are built up over a lengthy period of time, and finally advancing from the beach to the objective. OMFTS, on the other hand, bypasses the force build up on the beach and envisages the movement of a force directly from the sea against an operational objective or critical vulnerability. As a consequence, OMFTS capitalizes on surprise, tempo, and momentum to disrupt an adversary's Boyd Cycle, better known as the OODA Loop -- Observe, Orient, Decide and Act. The intent is to keep the enemy off balance -- to make decisions and execute them before he can react to the fluid, dynamic situation that is unfolding. "In general, whoever can make and implement decisions consistently faster [will gain] a tremendous, often decisive advantage."<sup>3</sup> Flexibility and speed are keys to success. As such, OMFTS forces will be lighter and more reliant on sea-based logistics, command and control, and fire support.<sup>4</sup>

The Naval Services are well suited for this role in the littorals. The end of the Cold War has seen a dramatic decrease in the number of overseas bases available for assigning American forces. Permanent U.S. overseas basing has steadily shrunk placing a premium upon the Naval Services' ability to maintain forward presence. Naval forces are unobstructed by overflight restrictions and host nation basing requirements fostering unimpeded access to the world's vital regions. "Operating on the high seas, naval forces incur no political costs in repositioning for advantage."<sup>5</sup> Oftentimes, the Naval Services will be the first credible force on the scene of crises and may necessarily act alone due to the inability of the other services to acquire advance staging bases or airfields. This is not to imply that the Navy and Marine Corps alone will accomplish OMFTS but to highlight the need for credible support for the landing force to be resident within the naval task force.

All commanders acknowledge that any future major operation or campaign will be a joint effort conducted by some combination of forces from the various services. Coordinating the efforts of these forces today is a challenge, and this challenge will only increase in the future. The JFC will have to consider many factors in his calculus to include the five operational functions. These functions will allow him "the wherewithal to plan, prepare, conduct, and sustain military actions across the full range of military operations."<sup>6</sup>

Operational fires is one function that will influence the JFC's ability to effectively use OMFTS.

### **TACTICAL VS OPERATIONAL FIRES**

Historically, operational fires were planned far in advance, conducted over a relatively long period of time, and were executed well before the start of a major operation or campaign. These fires were planned from the "top down" and used throughout the depth of the JFC's

area of operations in order to have a decisive effect on the major operation or campaign. Any fires that directly supported a tactical commander were outside the definition of operational fires. There existed an easily defined line separating tactical from operational fires.

Future warfare, however, will blur the lines between tactical and operational fires as the lethality and ranges of an adversary's weapon systems, as well as our own, require joint forces to operate over a larger and deeper battlefield. In particular, this increased performance of land-based threats required the Naval Services to alter their doctrine in order to operate well over-the-horizon, use the sea's maneuver space to avoid enemy strengths and levy technological changes to provide platforms for rapidly moving forces far inland. These maneuver forces must now be "supported by direct and indirect fires with extended range, greater accuracy, and greater lethality."<sup>7</sup> As OMFTS is executed, the tactical commander will depend upon fires generated from the operational level, which will thus require operational fires to deliver tactical characteristics such as timeliness, volume, and lethality. In some cases there will be "no clear distinction between operational and tactical fires in terms of timing and forces employed, because the same forces [will] conduct operational and tactical fires in the same time frame."<sup>8</sup>

Concurrently, as situational awareness increases on the battlefield, JFCs will have the ability see and engage the adversary quickly and decisively. He will have the potential to order fires against an enemy maneuvering against his subordinate units before the tactical commander is even aware of the threat. In this expanded, prescient battlespace, the JFC will have the means to influence his subordinates' actions by using his operational fires to isolate and shape the battlefield. As a result, command and control of joint fires supporting OMFTS

will undergo an extraordinary shift continuing a trend that will obscure the defining line between tactical and operational fires.

### **JOINT FIRE SUPPORT SYSTEM**

A key factor in the success of joint operations will be joint fire support. The lethal and nonlethal effects from joint fire support will “assist land, maritime, amphibious, and special operations forces to move, maneuver, and control territory, populations, and key waters.”<sup>9</sup> The JFC must direct and influence his operational fires by managing the three subsystems within the joint fire support system -- target acquisition, attack resources and command and control (C<sup>2</sup>).<sup>10</sup> These three subsystems have the greatest influence upon the JFC’s ability to adequately support OMFTS with operational fires.

### **TARGET ACQUISITION**

Technological improvements and enhanced equipment capabilities have expanded the initial lodgment of amphibious landing forces from approximately 30 to 50 square miles to an area of about 2500 to 3000 square miles under the OMFTS concept.<sup>11</sup> Simply, the size of the area within the JFC’s influence has increased dramatically. This affords friendly forces the opportunity to use space for maneuver but also provides space for the enemy to hide and maneuver. In this environment, accurate intelligence and timely information become paramount as we seek to attain a heightened level of situational awareness in order to acquire enough relevant data to prosecute key enemy targets.

The rapidity of future warfare will require a fusion of informational assets to provide the JFC and his subordinate commanders a common picture of the battlespace allowing them to make quick, relevant decisions. The components available to provide this common picture will increase in both quality and quantity. The importance of interoperability, connectivity



and reliability of the numerous Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C<sup>4</sup>ISR) sensors and systems become even more critical in this new environment to ensure joint forces are capable of interacting with each other as well as using the information to effectively defeat the enemy.

The JFC must ensure he has the capability to link his C<sup>4</sup>ISR assets into a common architecture that allows him to translate each sensor's picture of the battlefield into a single medium providing him the overall operational perspective. These sensors are "owned" by various agencies and provide unique information when fused together will bring the operational picture into clearer focus. They span the spectrum from national assets to service specific equipment and personnel. Satellites and U-2 aircraft, the Joint Strategic Aerial Reconnaissance System (JSTARS), unmanned aerial vehicles (UAVs), service's fixed-wing reconnaissance, and reconnaissance teams each contribute to the JFC's understanding of the operational situation. "Air Force systems such as Predator, Global Hawk, and Dark Star offer long-range, long-dwell, real time operational intelligence by executing deep penetration of enemy air space and wide area surveillance."<sup>12</sup> The JFC's heightened situational awareness will allow him to quickly react to rapidly changing situations oftentimes before the tactical commanders are aware of any threat (i.e. an enemy armored column moving from their staging area to reinforce their units). In this manner the JFC will continually use operational fires to achieve one or more purposes -- isolate the battlefield; interdict the enemy's uncommitted forces; facilitate friendly operational maneuver while preventing the enemy's; destruction or neutralization of the enemy's critical functions, facilities, logistical support and sustainment; and, diminishing the enemy's morale.<sup>13</sup>

The systems are in place to allow the JFC to “see the battlefield.” The challenge is to ensure these systems are interoperable. By using common architecture to synergize the information provided by these sensors, the JFC will ensure he maintains the momentum and tempo required to keep the enemy on the defensive and wondering where the joint force will attack next.

## **ATTACK RESOURCES**

The Marine Corps identified its OMFTS Naval Surface Fire Support (NSFS) requirements in December 1996. Basically, the Marine Corps established the need to have a responsive system that can engage targets up to 63 nautical miles away with an assortment of munitions. As technology evolves, the Corps stipulated an additional requirement to extend the range of NSFS to 200 miles inland.<sup>14</sup>

The Navy has admitted that they have “no credible surface fire support capabilities to support forced-entry from the sea and inland operations by Marine Corps and Army forces.”<sup>15</sup> Short of aviation assets and cruise missile capability (which is directed at the strategic level), the Navy has no means to provide operational fires. The criticality of this deficiency is apparent when you compare NSFS and aviation -- one is all-weather capable, the other is not; one is available twenty-four hours a day, the other is not; one can be shot down, the other cannot.

The Navy’s near-term solution to this dilemma is to upgrade and retrofit the current 5-inch gun on their destroyers and cruisers as well as develop and acquire an extended range guided munition. Though this program does extend the range of the 5-inch gun up to 63 nautical miles, it only provides a warhead that carries M80 improved conventional munitions (ICM); a submunition that is effective against soft or unarmored targets only. Additionally,

this portion of the Navy's program is not intended or expected to satisfy the full range of JFC's NSFS requirements.<sup>16</sup>

The Navy's long-term plans for NSFS, to be completed by 2020, are centered on a new ship being developed for littoral warfare, the DD-21 land attack destroyer. Providing an Advanced Gun System that uses twin 155mm guns (yet to be designed), the new destroyer is being hailed for its increased rate of fire and range over the redesigned 5-inch gun system.<sup>17</sup> However, both the 155mm and 5-inch (127mm) projectiles are small and will always be restricted to payload, lethality, and penetration capability. Furthermore, due to cost and accuracy considerations, the choice of loadings remains submunitions such as the M80 ICM. To augment the gun systems' shortcomings, plans for the land attack destroyer also calls for a Tactical Tomahawk and the next generation Land Attack Missile system.<sup>18</sup> Regrettably, this will not suffice to provide the JFC with a credible, all-weather, around the clock capability to deliver operational fires. For a gun-based system, the only way to meet the JFC's time of flight requirements and versatility of ordnance loading is a major caliber gun system (e.g. 12-inch or greater).

In conjunction with the Navy's plans to field these small caliber weapon systems, a plethora of surface-to-surface missile systems are envisioned to complement its fire support capabilities. One of the most mature missile systems available is the high performance Tomahawk that could be effectively used for operational fires. However, this system's cost has precluded its delegation for use to the JFC with authorization of use held at the theater-strategic or strategic level. Fortunately, there is a proposal to produce a littoral warfare weapon based on the existing Harpoon missile system that would use the joint direct attack munition, a GPS/INS guidance system and a 500-pound blast/fragmentation warhead.<sup>19</sup>

Provided the JFC is delegated the authority to use this missile, it could provide him with an all-weather alternative when aircraft are either unavailable or unable to hit the target.

Operational fires are not limited to combatant vessels, but aviation assets will also play an important role in supporting OMFTS. The carrier battle group (CVBG) will be an essential component of the naval forces conducting operational level fires.

The aircraft of choice for the future of naval aviation appear to be the F/A-18 E/F models and the Joint Strike Fighter (JSF). The F/A-18 E/F Super Hornet will handle the interceptor/fighter role while the JSF takes on the strike/ground support missions. The JSF will be able to call upon an improved family of munitions as it strikes targets in support of Marines conducting OMFTS. These weapons carry many names like Standoff Land Attack Missile Expanded Response (SLAM-ER), Joint Standoff Weapon (JSOW), Sensor Fuzed Weapon System (SFW), and Joint Air-to-Surface Standoff Missile (JASSM).<sup>20</sup>

Each ordnance type makes a valuable contribution to the JFC's ability to shape and isolate the battlefield. They capitalize on longer standoff distances from point of launch to target in an attempt to avoid the enemy's air defense systems. However, this makes them even more reliant on a sensory capability to attain the accuracy required to hit the target from the greater distances. Comparable to naval aviation are similar U.S. Air Force fixed-wing assets carrying nearly identical munitions. They provide additional punch for the JFC to use in contributing to operational fires yet they have the same limitations and drawbacks as their naval brethren. Additionally, the limitations of all the aircraft to attack under adverse weather/climatic conditions, limited payloads, and short loiter times necessitate complementary capabilities from other systems to ensure the JFC has the ability to conduct operational fires 24 hours a day.

It is important to remember that operational fires also include nonlethal methods of attack. These means are designed to deceive and confuse the enemy as well as deny his use of

various mediums. "Using electronic warfare, psychological operations, and operational deception, they can alter a potential adversary's assessment of his situation and prospects for success."<sup>21</sup> In this manner, the JFC disrupts his adversary's OODA loop -- slowing down his enemy's decision making ability, denying him valuable intelligence, and interrupting his C<sup>2</sup> capability. The JFC must make certain these resources are included in his operational fires.

The U.S. Army also has a variety of weapon systems that contribute to the JFC's ability to exploit operational fires. "Some of these systems, like the Apache Longbow, Comanche, Multiple Launch Rocket System, and Crusader, with extended range and accuracy will be able to provide tactical fires and play a more significant role in the delivery of operational fire. This dual capability of army weapon systems will greatly increase the potential and responsiveness of operational fires."<sup>22</sup> They give the JFC more choices and available options to meet his operational fire requirements. Whether these systems, or Air Force assets, will be available for the JFC's use will be predicated on the theater's infrastructure and the ability to utilize advanced land bases.

## COMMAND AND CONTROL

Joint fire support typically involves two interrelated operations: air-to-surface and surface-to-surface joint fire support. Joint fire support can also be nonlethal and/or disruptive (e.g., EW). But regardless of the attack system used, joint fire support requires coordination and integration of airspace as well as coordination of air and surface-to-surface attack resources.<sup>23</sup>

Joint Pub 3-09

"The effective integration and synchronization of multi-Service deep attack forces and weapon systems in a combat theater currently poses a significant challenge for the joint force commander."<sup>24</sup> As the assets and platforms available to the JFC for conducting operational fires continues to grow, there will be a comparable increase in the complexity of the JFC's C<sup>2</sup> tasks. His ability to "seamlessly fuse the combat power of the various service

components while maintaining the safety and freedom of maneuver” of the OMFTS force will be one of his biggest dilemmas.<sup>25</sup> The JFC must ensure cooperation and coordination between the services’ fire support control agencies cutting response time to a minimum. Controlling the efforts of the Marine Corps’ Fire Support Coordination Center and Direct Air Support Center, the Navy’s Supporting Arms Coordination Center and Tactical Air Control Center (Afloat), the Air Force’s Air Operations Center (AOC), and the Army’s Deep Operations Coordination Center in order to provide maximum efficiency, effectiveness, and unity of effort will be a tremendous undertaking. “Efficiency acknowledges the limited and vital nature of operational fires’ assets, to include aircraft available for interdiction sorties, and seeks to maximize their availability. Also related to efficiency is the speed and simplicity of the process/organization for targeting, planning, and coordination of operational fires.”<sup>26</sup> Like the C<sup>4</sup>ISR systems discussed earlier, the JFC must guarantee that current and future C<sup>2</sup> systems will network together to realize the synergy of a common multi-service link.

Because of the numerous multi-service fire support agencies, the JFC will become more reliant upon automated systems to manage his joint fire assets. The Army Field Artillery Tactical Data System (AFATDS) is one system currently being fielded which provides the U.S. Army and Marine Corps with fully automated support for the planning, coordination, control, and execution of tactical close, tactical deep, and operational fires. AFATDS is capable of coordinating the myriad of weapons systems available to the JFC including fixed-wing aircraft, NSFS, attack helicopters, rockets, and missiles. Its common architecture ensures compatibility with joint force systems and provides commanders at all levels with the common picture needed for joint fire support operations. It also removes much of the stovepipe structure that is prevalent in today’s fire support system allowing

commanders to engage targets quicker and with the right weapon. This, however, also puts a premium on the JFC capabilities to effectively coordinate joint fires.

To enhance the JFC's C<sup>2</sup> capability, the Marine Corps levied the requirement that all enhanced NSFS combatants and amphibious command and control shipping must have the capability to access, input, receive, and instantaneously process information into and from AFATDS.<sup>27</sup> Three of the services have the capability to coordinate joint fire support assets, via AFATDS, minimizing interoperability problems. To close the loop, AFATDS "has demonstrated its ability to interface with the Air Force's primary information management system in the Air Operations Center," the Contingency Theater Automated Planning System (CTAPS).<sup>28</sup> Because CTAPS maintains information on the theater air situation and assists in the development of Air Tasking Orders, the JFC has relevant architecture to command and control operational fires within a central agency.

The joint doctrinal publication for fire support places upon the JFC the responsibility for coordinating and implementing joint fires yet the C<sup>2</sup> structure is fragmented along service lines causing redundancies, conflicts, and a lack of responsiveness. The time is right to consolidate operational fires within a single agency at the Joint Task Force level under the direction of a Joint Forces Fire Support Coordinator (JFFSC). Functioning in harmony with the Joint Forces Air Component Commander, the JFFSC would be responsible for fully integrating the various networks and multi-service agencies to maximize the potential of operational fires and meet the JFC's requirements. Assisted by a fire support cell, the JFFSC would "maintain continuous communication links with the DOCC and Navy/Marine operations centers" and coordinate with the AOC to attain the synergies inherent in the joint fire support system.<sup>29</sup> A JFFSC would foster the "top-down" planning approach for

operational fires and would greatly assist the JFC in properly determining his objectives, finding and designating his targets, and assigning the appropriate command echelon to carry out strikes.<sup>30</sup>

## **CONCLUSION**

The future JFC faces a rapidly changing, fluid situation where decisions must be made quickly and targets located, identified, and engaged accurately and responsively. With increased situational awareness and responsiveness of acquisition and targeting systems, the distinction between tactical and operational fires will become more difficult to recognize as the JFC quickly and effectively shapes the battlefield with joint fires. He will exercise command and control over a vastly larger, more complex area making communications connectivity and multi-service interfacing of paramount importance. He must have a credible capability to attack all types of targets day or night in all possible weather and climatic conditions, which requires weapon platforms that meet these criteria. Additionally, he requires the means to compile, interpret, and disseminate large amounts of information from a variety of C<sup>4</sup>ISR sensors and systems. All these capabilities are present but must be fostered to realize their future benefits.

## **RECOMMENDATIONS**

One of the critical necessities to effectively conduct future operational fires is ensuring all sensory systems and C<sup>4</sup>ISR assets feed into a common network allowing the JFC and his subordinate commanders to gain increased battlefield awareness. Attaining a clearer situational picture will give commanders the ability to identify and engage enemy targets quicker and more effectively. Each of the services' systems must be interoperable with the others to ensure they have the capability to link together and pass information. Joint Forces



Command should take the lead and use the AFATDS as a point of departure in working toward an integrated solution that will speed up the process from sensor-to-shooter.

Because of the immense space OMFTS forces will be operating within, the need for adequate, consistent, over-the-horizon communications is critical. OMFTS forces must be assured of their capability to talk with all echelons of command as well as with their sister services. Again, interoperability is key but so is the ability to use satellites or UAVs as communications relays in order to achieve the links to span the greater distances. These need to be worked out within the joint arena before hostilities begin.

Joint doctrine should include the establishment of the JFFSC in order to realize the maximum potential of operational fires. The JFFSC would remove redundancy, simplify deconfliction, and improve responsiveness of operational fires. His mission would be to synergize the multi-service assets in order to accomplish the JFC's mission.

The OMFTS concept relies heavily upon sea-based fires. Since the availability of land-based aviation assets will be negligible, it will be vital that amphibious forces and shipping task organize with a CVBG to provide operational fires in the early stages of the operation. Carrier-based air will probably be the only credible aviation asset available in the early stages of a developing crisis. Consequently, the JFC contemplating the use of OMFTS must insist on the allocation of a CVBG to his Joint Task Force.

OMFTS requires a credible NSFS capability. The Navy's current plans provide the minimal requirements needed to successfully implement OMFTS. The Navy should continue plans to retrofit its current inventory of destroyers and cruisers with the improved 5-inch gun system. However, the DD-21 program should be revised to include a major caliber gun system that would provide NSFS to the future OMFTS force. Included in this system should

be the capability to engage targets at great distances as well as utilize a variety of warheads and munitions. This, however, does not solve the near-term lack of NSFS.

In order to accommodate the near-term NSFS requirement (through 2015), the Navy should reactivate its two battleships, equip them with AFATDS, and refine the 16-inch extended range projectile (EX-148, 13.65-inch sabot, the DARPA 11-inch sabot, and the SRC 280mm sabot from 1969).<sup>31</sup> With a 1,300 pound projectile and a 45 nautical mile range, the EX-148 meets the basic Marine Corps' range requirement. The DARPA 11-inch sabot projectile has a calculated range up to 100 nautical miles, exceeding the 63 nautical mile limit of the 5-inch round. All of these extended range projectiles carry a variety of warheads and munitions designed to destroy soft, hardened, and armored targets. To compensate for the addition of the two battleships onto the active register, the Navy should request joint program support and an increase in the manpower caps to support this joint force weapon platform.

Some of these recommendations may seem radical. However, the JFC will need these capabilities in the future to successfully fight the joint force and effectively provide operational fires. Without them, the JFC will be at a distinct disadvantage and will be unable to properly use OMFTS to accomplish operational objectives.

## NOTES

<sup>1</sup> National Academy of Sciences. "The Navy and Marine Corps in Regional Conflict in the 21<sup>st</sup> Century." <<http://www.nas.edu/cpsma/nsb/reglconf.htm>> (4 January 2000).

<sup>2</sup> Concepts Division, Warfighting Concepts for the 21<sup>st</sup> Century (Marine Corps Combat Development Command Quantico, VA), I-9.

<sup>3</sup> U.S. Marine Corps, Warfighting (MCDP-1) (Quantico, VA.: 20 June 1997), 85.

<sup>4</sup> U.S. Marine Corps, Expeditionary Operations (MCDP-3) (Quantico, VA: 16 April 1998), 93.

<sup>5</sup> Roger W. Barnett, "Grasping 2010 with Naval Forces," Research Report 2-97 (Newport: 1997), 31.

<sup>6</sup> Milan Vego. On Operational Art, 4<sup>th</sup> Draft, Sept 1999, 267.

<sup>7</sup> Concept and Employment Working Group. "Concept of Employment for Naval Surface Fire Support (Near Term Capability)." <<http://www.fas.org/man/dod-101/sys/ship/weaps/docs/C1031.htm>> (4 January 2000).

<sup>8</sup> Milan Vego. On Operational Art, 4<sup>th</sup> Draft, Sept 1999, 291.

<sup>9</sup> Joint Chiefs of Staff, Doctrine for Joint Fire Support (Joint Pub 3-09) (Washington, D.C.: 12 May 1998), v-vi.

<sup>10</sup> Ibid. II-1.

<sup>11</sup> National Academy of Sciences. "The Navy and Marine Corps in Regional Conflict in the 21<sup>st</sup> Century." <<http://www.nas.edu/cpsma/nsb/reglconf.htm>> (4 January 2000), 66.

<sup>12</sup> Robert J. Rice, "Operational Fires for the 21<sup>st</sup> Century: The Argument for a Joint Fires Coordinator," (Unpublished Research Paper, Air Command and Staff College, Maxwell AFB, AL: 1998), 19.

<sup>13</sup> Milan Vego. On Operational Art, 4<sup>th</sup> Draft, Sept 1999, 296.

<sup>14</sup> Commanding General, Marine Corps Combat Development Center to Chief of Naval Operations (N85 and 86), 3 December 1996, <<http://www.usnfsa.com/articles/usmc/usmc1.htm>>, "Subj: Naval Surface Fire Support for Operational Maneuver from the Sea."

<sup>15</sup> General Accounting Office, Program Status: Naval Surface Fire Support, Report to the Secretary of Defense (Washington: 1997), 1.

<sup>16</sup> Ibid. 2.

<sup>17</sup> Tracy A. Ralphs, "Where are the Battleships," Armed Forces Journal International, April 1999, 46-52.

<sup>18</sup> Mike Mullen, "Surface Warfare into the Millennium." <<http://surfacewarfare.nswc.navy.mil/magazine/introjanfeb.html>> (16 December 1999).

<sup>19</sup> John W. Townes III, "Surface Strike: The Powerful Punch of Deterrence," Surface Warfare, January/February 1997, 20.

<sup>20</sup> Joseph M. Lance, "OMFTS: Innovative Concept but Can We Support It with Fires," (Unpublished Research Paper, U.S. Army Command and General Staff College, Fort Leavenworth, KS: 1997), 32.

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<sup>21</sup> Roger W. Barnett, "Expeditionary Power Projection: An Operational Concept for the U.S. Navy," Research Report 5-96 (Newport: 1996), 6-7.

<sup>22</sup> Gregory B. Schultz, "Coordinating Operational Fires for the Twenty-first Century," (Unpublished Research Paper, U.S. Army Command and General Staff College, Fort Leavenworth, KS: 1998), 46.

<sup>23</sup> Joint Chiefs of Staff, Doctrine for Joint Fire Support (Joint Pub 3-09) (Washington, D.C.: 12 May 1998), II-16.

<sup>24</sup> P.J. Walsh, "Assessment of Organizational Options for Deep Attack," IDA Paper P-3099, (Alexandria, VA: Institute for Defense Analyses), June 1995, 4.

<sup>25</sup> Robert J. Rice, "Operational Fires for the 21<sup>st</sup> Century: The Argument for a Joint Fires Coordinator," (Unpublished Research Paper, Air Command and Staff College, Maxwell AFB, AL: 1998), 4.

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<sup>27</sup> U.S. Marine Corps, "Naval Surface Fire Support for the 21<sup>st</sup> Century," Marine Corps Gazette, March 1997, 4.

<sup>28</sup> Robert J. Rice, "Operational Fires for the 21<sup>st</sup> Century: The Argument for a Joint Fires Coordinator," (Unpublished Research Paper, Air Command and Staff College, Maxwell AFB, AL: 1998), 27.

<sup>29</sup> *Ibid.*, 32.

<sup>30</sup> Milan Vego. On Operational Art, 4<sup>th</sup> Draft, Sept 1999, 291.

<sup>31</sup> John F. Lehman and William L. Stearman, "Keep the Big Guns," U.S. Naval Institute Proceedings, January 2000, 43.

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